⊙ **voke Research**

SOLUTION SNAPSHOT™ REPORT:

Parasoft Virtualize

By Theresa Lanowitz | November 1, 2011

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◉ SUMMARY

Adopting a lifecycle virtualization strategy benefits organizations by rapidly lowering capital and operational expenditures. Lifecycle virtualization enables development, QA, and operations teams to be more efficient and strategic by providing access to the correct environments, components, and services when and where needed.

The Parasoft Virtualize solution brings virtualization to the core of the lifecycle and delivers much needed accessibility and speed to developers, testers, and partners. Parasoft Virtualize delivers accessibility by removing constraints associated with limited access to systems, capacity, and unavailable or incomplete systems and components.

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EXECUTIVE OVERVIEW

Virtualization technology caused a revolution in the data center and was the technology of choice for every member of the C-suite as a result of its amazing effect of lowering capital expenditures (CAPEX). The value proposition in the data center was very clear to understand, and results were rapid.

Virtualization technology now stands to change other parts of the IT organization, specifically the development, quality assurance (QA), and operations teams. Lifecycle virtualization[1] is delivering value by removing constraints in the lifecycle and between teams, speeding time-to-market, lowering costs, and freeing teams from tactical activities.

By adopting a lifecycle virtualization strategy, organizations can rapidly lower CAPEX and operational expenditures (OPEX). Lifecycle virtualization enables development, QA, and operations teams to be more efficient and strategic by providing access to the correct environments, components, and services when and where needed. Lifecycle virtualization solutions reduce the costly wait time frequently associated with testing. With a more efficient and strategic approach, the lifecycle becomes more nimble, and teams can focus on delivering a faster time-to-market, with greater quality, while keeping costs under control.

This report features analysis of and commentary about Parasoft Virtualize. For more detail and analysis of the lifecycle virtualization market, see *voke Category Snapshot™ Report: Lifecycle Virtualization* – November 7, 2011.

MARKET CONTEXT

The lifecycle lends itself extremely well to the benefits of virtualization. Those benefits have expanded significantly from the first generation of lifecycle virtualization solutions that focused on virtual lab management (VLM) only, to the second generation and expansion to the cloud, to today: the third generation of lifecycle virtualization.

The third and current generation of lifecycle virtualization includes solutions for:

- VLM — virtualizing and delivering an environment as close to production as possible
- Virtualized cloud platforms — a logical extension of VLM, enabling organizations to rapidly and inexpensively create production-like cloud environments. As the move to public, private, and hybrid clouds becomes more pervasive, development and testing teams need on-demand access to cloud platforms prior to moving applications or services to production.

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1 Lifecycle virtualization is defined as the use of technologies such as virtual lab management, service virtualization, defect virtualization, device virtualization, virtualized cloud platforms, et cetera, to enhance the application or product lifecycle through the reduction of defects, lowering costs, speeding time-to-market, and increasing customer satisfaction.

- Service virtualization — giving development and testing teams access to either unavailable or limited services in a virtualized environment. Virtualized services may be a database, mainframe, architecture, et cetera. Service virtualization also leads the way for virtualized or shared infrastructure.

- Defect virtualization — using virtualization technology to record an application as it executes and then replay it to identify the point of failure, empowering teams to eradicate even the most elusive defects.

- Device virtualization — using virtualization and simulation to allow physical devices to be virtually deployed for testing

While lifecycle virtualization has not penetrated the market as extensively as a disruptive technology should, the demands placed on all aspects of the business are requiring more efficiency at every phase, including the lifecycle.

voke is predicting the following for lifecycle virtualization:

- Lifecycle virtualization will be the hub of the modern lifecycle. As the hub, lifecycle virtualization will shatter silos across development, QA, and operations.

- Lifecycle virtualization will be a major disruptor in breaking bottlenecks in the lifecycle.

- Widespread adoption of lifecycle virtualization will occur across all industry sectors.

- Compliance issues will bring to the forefront the challenge of licensing in virtual environments. This will force software vendors to rethink licensing models to accommodate the exploding use and benefits of virtualized environments.

Lifecycle virtualization is an important and emerging category that will enable organizations of all types and sizes to reduce manual activities that are expensive and error-prone. Initial adoption of lifecycle virtualization will appeal to the logical need to lower CAPEX. However, as lifecycle virtualization becomes part of the lifecycle, organizations will experience tremendous strategic value through adoption and ongoing consistent use of the technology.

⊙ LIFECYCLE COMPLEXITY

Software and applications continue to grow in complexity. And while complexity increases at a rapid rate, development and QA teams do not grow in proportion.

Development and testing environments are frequently constrained due to budgets, scheduling, or lack of availability. Development and QA teams are too often delayed in completing critical activities because what the teams need is not available due to incompleteness or scheduling conflicts.

Because of delays associated with access to critical environments, services, systems, or other key assets, testing is frequently limited. This limited testing means environments and configurations are often incompletely tested or untested. Test coverage is impacted by these delays.

Service and System Availability

Testing of and access to environments such as mainframes, large ERP systems, and third-party systems is typically limited. Access is limited because of the unavailability of systems or components due to incompleteness or scheduling conflicts. Limited access results in testing delays or incomplete testing that add to schedule and cost. This is prevalent when business transactions involve third parties or partners operating mainframes or ERP systems. This usually creates scheduling conflicts in granting testers access to the required systems—as well as excessive access fees.

Performance

Performance testing is often incomplete, inadequate, or ignored due to the excessive cost of creating a production-equivalent environment. Limited capacity in development and testing environments hampers realistic performance testing. The effect on performance testing is further exacerbated by inaccessible or incomplete dependent systems.

Test Data

Proper testing requires production-equivalent test data. However, privacy concerns and compliance restrict the use of live data in test environments. Proper testing of data means QA teams need access to production-scale data and a production-equivalent environment for testing. Delivering the proper data structure and environment is a significant cost burden without the use of automated test tools and solutions.

Development and Test Labs

The need to build out costly test environments prohibits organizations of all sizes from delivering the best and most thoroughly tested software possible.

Development and QA teams both wait for the configuration and provisioning of environments from operations groups. Proper environments go well beyond just hardware and include operating systems as well as supporting software applications and databases.

Defect Reproduction

Developers and testers are frequently locked in conflict over the inability to reproduce a defect identified in testing or verify a fix in the proper environment. In many cases, defects are left unresolved and released to production or the field. Errors found in production or the field are far more costly. This inability to resolve a defect adds to cost and quality issues.

Unresolved defects remain in source code indefinitely and cause problems in subsequent releases of the software or application.

All of these complexity challenges are compounded when dealing with third parties such as systems integrators, professional service providers, or partners. In global and multi-dimensional organizations, development and QA teams need to be as productive as possible and meet schedule, cost, and quality goals.

⊙ MODERN SOLUTIONS

Lifecycle virtualization solutions such as Parasoft Virtualize are emerging in the market to solve classic problems associated with application/software development, testing, and delivery.

Access to appropriate environments, components, and systems is a classic development and test problem in need of a modern solution. Access constraints are removed through the use of lifecycle virtualization solutions, specifically solutions with service virtualization capability. Providing development and QA organizations access to what is needed at the required time and location keeps the teams productive and active.

Lifecycle virtualization is the hub of the modern lifecycle. Lifecycle virtualization will enable more fluid collaboration and communication between development and QA teams as they work to manage and tame increasingly complex software and applications. Removing unnecessary constraints and delays through lifecycle virtualization will facilitate a faster time-to-market, on budget, and with a high degree of quality.

Adopting a solution such as Parasoft Virtualize will help lifecycle stakeholders remove unnecessary constraints, improve access, and reduce the overhead and cost of managing and maintaining development and testing environments.

ABOUT PARASOFT VIRTUALIZE

Parasoft, founded in 1987, is an independent software vendor specializing in software development lifecycle automation. The company offers solutions in the categories of software development management, software quality lifecycle management, and development/test environment management.

Parasoft Virtualize, the company's lifecycle virtualization product, provides access to development and test environments by eliminating constraints inherent in complex, heterogeneous, and component-based applications.

Parasoft Virtualize is one of nine products offered by the company. Parasoft Virtualize is sold separately and integrates with popular industry testing and application lifecycle management (ALM) solutions including Parasoft Concerto and Parasoft Test.

⊙ PLATFORM SUPPORT

Parasoft Virtualize runs locally on the Windows and Linux platforms and supports the following technologies and protocols:

- HTTP/HTTPS
- ISO 8583
- JDBC
- JMS (WebShpere, webMethods, Sonic, TIBCO and others)
- JSON
- MQ
- MTOM (XOP)/MIME/DIME attachments
- .NET
- PoX
- REST
- SAML
- SOAP
- WSDL
- WS-*
- WS-Security
- XML
- XML Schema
- Fixed-length messages
- Custom

⊙ SOLUTION OVERVIEW

Parasoft Virtualize is a lifecycle virtualization solution that allows easy and fast access to any environment needed to develop, test, or validate software or an application—on-demand—at any point in the lifecycle.

Parasoft Virtualize's flexible architecture enables five core operations for lifecycle virtualization:

1. Define
2. Capture/model
3. Instruct
4. Provision
5. Utilize/consume

Developers or testers using Parasoft Virtualize define the components of the system under test that need to be virtualized for the purpose of development or testing.

When the developer or tester has access to a live instance of the component, the real behavior of the virtualized asset is captured by Parasoft Virtualize. If the system is unavailable or incomplete, the behavior of the intended virtualized asset is modeled. At this point in the process, a Parasoft Virtualized Asset (PVA) is created.

The PVA's behavior can be fine-tuned. For example, it is possible to adjust performance, data source usage, and conditional response criteria.

The PVA can then be provisioned or deployed within the desired infrastructure for testing purposes. The infrastructure may be a server, public cloud, private cloud, or hybrid cloud for simplified uniform access.

Once the PVA is provisioned or deployed to the desired infrastructure, developers, testers, or partners may consume and utilize the PVA to conduct testing on an as-needed basis. The PVA may be used in conjunction with all popular commercially available testing solutions. Constraints of system access are removed.

At the conclusion of the test cycle with PVAs, the environment may be provisioned with real assets so teams or partners may conduct a complete end-to-end test for final testing.

There are a variety of different use case scenarios for how Parasoft Virtualize may be used within the lifecycle. Regardless of use case, the flow of using Parasoft Virtualize remains the same. Developers, testers, or partners get access to the required environment for testing on-demand.

Common lifecycle use cases for Parasoft Virtualize include:

- Accessibility — providing testers with access to the services, environments, or systems needed to deliver thorough and complete testing
- Parallel development enablement — eliminating system dependencies and providing access to incomplete, unfinished, or evolving components for testing

- Test data management — simplifying the test data management process to simulate realistic production scenarios in testing

- Realistic performance tests — removing capacity constraints from testing environments to prevent corruption in testing

- Training — assisting training labs to provide clean data limits CAPEX, and reduces the risk of data corruption

SOLUTION ANALYSIS

Parasoft Virtualize represents a new breed of lifecycle virtualization solution that uses service virtualization to reduce the time required to configure applications for test, lower costs associated with hardware or system access, increase quality, and increase team productivity. Service virtualization used by Parasoft Virtualize removes constraints and allows developers and testers access to environments, components, or systems when and where needed.

The Parasoft Virtualize solution brings virtualization to the core of the lifecycle and delivers much needed accessibility and speed to developers, testers, and partners. Parasoft Virtualize delivers accessibility by removing constraints associated with limited access to systems, capacity, and unavailable or incomplete systems and components. Developers, testers, and partners work without delays and are able to meet time-to-market pressures.

Parasoft Virtualize uses the same mechanics in creating a PVA, regardless of the specific use case scenario that is exercised. This common workflow helps organizations with varying degrees of technical skills. Delivering a consistent workflow with an easy-to-use user interface removes some of the hesitation associated with the adoption of a new tool or solution.

Parasoft Virtualize integrates with popular testing solutions such as HP Quality Center, IBM Rational Quality Manager, Oracle ATS, and Parasoft Test. Integration with popular testing solutions allows testers to use the solution that is most familiar while conducting efficient and timely end-to-end functional and performance tests.

Parasoft is a vendor forging the adoption of lifecycle virtualization solutions. The market is in the emerging state and early phases of adoption. Parasoft must continue to deliver new and differentiated value in Parasoft Virtualize to remain competitive in what will most certainly become a very innovative and disruptive market.

Potential customers should be aware of the key strengths and weaknesses of Parasoft Virtualize during the evaluation phase.

Strengths:

- Ease of use

- Consistent workflow

- Integration with existing testing solutions

- Test data management component

- Performance testing in virtual environments

- Flexible and open architecture

- High customer satisfaction

- Price

Weaknesses:

- Lack of broad industry partnerships

- Third-party tools leveraged for highly complex test data scenarios

Because the lifecycle virtualization market is in the early stages, expect a variety of start-up vendors to emerge as the demand for lifecycle virtualization expands. Innovation in this market will accelerate as early adopters identify benefits associated with lifecycle virtualization solutions. Because of its ease of use and consistent workflow, we expect Parasoft Virtualize to be a strong contender in the lifecycle virtualization market.

SOLUTION HIGHLIGHTS

Parasoft Virtualize benefits developers and QA teams by enabling them to easily create an environment that realistically represents the constrained components that they need to access to complete their development or testing tasks. In addition to creating virtualized assets that emulate specific constrained components, it enables developers or QA teams to create an "instance" that represents a specific permutation or combination of real and virtualized assets. The notion of an "instance" and the management of complex transactions through both real and virtualized assets is critical for iterative testing.

Historically, development and QA teams are under pressure to rapidly complete their assigned tasks despite delayed or limited access to dependent components. Parasoft Virtualize enables teams to advance their development and testing efforts without having to wait for access to the dependent components. The reduction in wait time enables faster software delivery as well as more complete and thorough testing.

Parasoft Virtualize assists development teams that are trying to evolve interconnected components in parallel. By virtualizing the dependent components' expected behavior, each team can move forward without having to wait for the others to complete their work.

The solution aids QA teams in their quest to thoroughly test the designated application even when dependent system components are not yet ready or available for testing. Furthermore, test organizations spend excessive time waiting for test-ready code from development. Parasoft Virtualize reduces the wait time and risk associated with incomplete applications by allowing QA teams to model expected behavior. The reduction in wait time enables more complete and thorough testing of code and environments. QA teams are able to complete end-to-end testing without compromising schedule or costs.

As the adoption of Parasoft Virtualize grows, organizations with dedicated automation or performance centers of excellence (CoE) will find the addition of lifecycle virtualization essential. Adding lifecycle virtualization subject matter experts to an established CoE will help institutionalize the skill set across the organization.

⊙ EASE OF USE

Many organizations are using internally developed tools in an attempt to deliver lifecycle virtualization functionality. Internally developed tools are typically not scalable, lack in support, and become too expensive and difficult to maintain. Eventually, these teams will reach a point where an internal solution is no longer a viable or cost-effective solution.

Ease of use of a commercially available solution is often a requirement. Because development and QA teams frequently conduct evaluations of new technology on top of having to complete their regular work, evaluation teams are eager to try a solution with an easy-to-use user interface and a consistent workflow. This criterion is especially important for solutions that promise a quick ROI.

Parasoft Virtualize is differentiated in the market because of its ease of use and attractiveness to teams with varying degrees of technical prowess.

⊙ INTEGRATION

Parasoft Virtualize allows users to work without time, location, or infrastructure constraints. Part of the removal of constraints means flexibility and integration with other lifecycle virtualization solutions, cloud provisioning tools, and traditional application lifecycle management (ALM) solutions.

Virtualized assets created in Parasoft Virtualize may be called for in unit, functional, and performance tests and leveraged by popular test environments such as HP Quality Center, IBM Rational Quality Manager, Oracle ATS, and Parasoft Test.

Through this integration with existing testing solutions, Parasoft Virtualize enables an organization to preserve existing investments in both tooling and skills while delivering more value by speeding up the testing process and removing constraints. Parasoft Virtualize adds value to any development and test organization by complementing and

integrating with existing automated or manual solutions, or working as a stand-alone solution to facilitate more complete and thorough testing.

⊙ DEFECT VIRTUALIZATION

Defect reproduction is an often elusive issue that developers, QA teams, and ultimately end-users must deal with. When test teams identify an issue, historically, reproduction by development has not always been guaranteed. Additionally, if reproduction is achieved by development, there is no guarantee that the defect remediation has not caused a cascading effect and produced another defect elsewhere in the source code.

Parasoft Virtualize creates a test environment as an "instance". The "instance" is attached to the defect. Everything travels and moves with the "instance" to ensure that the developer has everything associated with the defect. This complete environment means that when a defect is fixed, it is really fixed and does not inadvertently create another defect that might potentially go undetected. This also enables QA teams to verify the fix in the actual environment where the defect was found.

⊙ TEST DATA MANAGEMENT

One of the most frequently overlooked aspects of testing is test data management. Test data management is pivotal in reducing the time spent on test data preparation as well as reducing the risk of a compliance or security breach through inappropriate use of test or production data. Best practices in test data management call for test data to retain the proper data structure for testing while scrambling, encrypting, or masking the data for security purposes.

Parasoft Virtualize enables test teams to automate test data preparation and masking. Test teams have the ability to independently generate, scramble, mask, and refresh test data. This is a compelling and attractive feature of the product and the strategic value should not be overlooked.

⊙ PERFORMANCE TESTING

Performance testing is one of the most critical components in the lifecycle. Yet, obtaining accurate results is complicated by a number of obstacles. Performance testing is traditionally performed within the organization's own boundaries, making end-to-end performance testing involving third-party calls extremely challenging. When these third-party components can be accessed, such access typically incurs not only scheduling restrictions and access fees, but also bandwidth charges which can escalate rapidly for large-scale, high-throughput load or stress tests. Moreover, if the test environment does not match the production environment (e.g., in one case, the database is running on

a virtual machine; in another, it is on a dedicated server), performance test results will inevitably be inaccurate.

Parasoft Virtualize enables performance testing through the use of service virtualization. Dependent application components can be virtualized and exercised in place of the actual components during performance testing. Deployed in this manner, the virtual assets can be accessed without scheduling issues and without incurring any fees.

The team can then analyze the virtualized assets' impact on the performance and behavior of the application under test. For example, if a business application relies on a database backend as a dependency, Parasoft Virtualize can emulate the database connection and the query execution times to assess their impact on the user experience at the application interface level. Performance is initially set to mimic the components' historical performance, and can be adjusted using graphical user interface (GUI) controls to simulate various "what if" scenarios.

Due to the rapid ascendance of the cloud, performance along with security are rapidly becoming the two most important pillars of testing. Parasoft Virtualize is innovating in lifecycle virtualization and performance testing.

⊙ SOLUTION SUMMARY

Parasoft Virtualize has the potential to play a significant role in the lifecycle virtualization market. With its ease of use, testing solution integration, defect virtualization with environment replication, test data management ability, and ability to remove performance testing roadblocks, Parasoft Virtualize is a solution that can be used by organizations of all types and sizes.

⊙ BENEFITS

Parasoft Virtualize helps organizations achieve the ultimate goal of staying on schedule and budget while producing a high degree of quality. Parasoft Virtualize is a solution created to benefit development and QA organizations.

Parasoft Virtualize:

- Accelerates time-to-market by reducing testing time.
- Reduces access fees to third-party environments or systems.
- Eliminates lab configuration time.
- Eliminates cascading defects as a result of incomplete environments for defect replication and remediation.
- Reduces delays experienced by testing teams working in parallel development environments.

- Removes constraints to environments, components, and services.

- Removes bottlenecks associated with environment set-up, maintenance, and management.

- Delivers predictability and consistency.

- Enables more thorough and complete testing.

- Enables faster time-to-market.

Developers and testers alike will benefit from a consistent and easy-to-use workflow to speed access to constrained systems, components, and services.

ASSESS YOUR ORGANIZATION

Ultimately, every organization will reach the conclusion that lifecycle virtualization is a technology that must be used to complement existing lifecycle solutions to help manage growing complexity, meet time-to-market pressures, and deliver a greater level of quality. Parasoft Virtualize is a solution that offers lifecycle virtualization benefits today.

Assess the readiness of your organization today to adopt a lifecycle virtualization solution.

- Does your organization struggle with the time and cost involved in setting up development or test environments?

- Does your organization experience delays because of unavailable or incomplete services, systems, or components during testing?

- Does your organization struggle with access to realistic performance testing environments?

- Does your organization need to reduce the access fees and third-party charges involved in functional and performance testing?

- Does your organization struggle with building and testing applications that interact with frequently changing components?

- Does your organization need to simplify its test data management strategy?

If you answered "yes" to any of these questions, your organization is ready at some level to embrace lifecycle virtualization. Once lifecycle virtualization is brought in to an organization, benefits will quickly be demonstrated and the desire to adopt it will spread rapidly.

JUSTIFY THE PURCHASE

Individual organizations may calculate projected ROI from a lifecycle virtualization solution such as Parasoft Virtualize by tracking any of the following suggested measurements.

Hardware Savings

- Number of physical servers replaced

- Number of physical machines replaced

- Storage and memory cost reduction

- Heating and cooling cost reduction

Lab and Environment Efficiency

- Time/headcount required to provision and deploy environments

- Time/headcount required to establish development and test labs

Productivity

- Time to deliver applications/software to production

- Number of platforms/environments tested

- Number of defects found/remediated prior to production

- Time associated with delays of system, component, service availability

- Parallel development time savings

- Improved productivity enabled by more strategic activities for developers and testers

Access Fee Savings

- Reduced time spent on shared infrastructure environments such as mainframes

- Reduced time for testing

Customer Satisfaction

- Fewer service calls associated with new releases

- Improved customer reaction to applications/products

Assess your organization's need for overall quality improvement by both development and QA and make a case for the adoption of lifecycle virtualization solutions to complement existing application lifecycle activities.

NET/NET

Parasoft Virtualize should be considered as either a complement to existing lifecycle solutions from a variety of vendors or as a stand-alone solution to act as the hub of all lifecycle activity.

Conduct a proof of concept or pilot with Parasoft Virtualize to determine how the solution fits within your organization. Once a part of lifecycle activities, Parasoft Virtualize may become part of an established center of excellence for either test automation or performance.

November 1, 2011

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⊙ ABOUT VOKE

voke, founded in 2006, is a modern independent technology analyst firm focused on the edge of innovation. voke's primary coverage area is the application lifecycle and its global transformation, including virtualization, cloud computing, embedded systems, mobile and device software.

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